

WHAT IS CLAIMED IS:

1. A linear guide bearing apparatus, comprising:

a guide member having a curved circulating path defined by inside and outside curved faces;

5 a plurality of balls moving along the curved circulating path of the guide member; and

a separator interposed between the adjacent balls such that an axial line of the separator is parallel to or coincides to a straight line combining center points of the adjacent balls, 10 the separator defining concave faces at both ends thereof in the axial direction respectively at least partially contacting spherical surfaces of the adjacent balls,

wherein an outer diameter of the separator is set to have a size more than a maximum outer diameter under a condition 15 where the balls roll while contacting with the both inside and outside curved faces of the curved circulating path, and

a radius of curvature of the inside curved face is reduced to such a size not as to contact with the separator, and/or a radius of curvature of the outside curved face is enlarged 20 to such a size that the inside curved face does not contact with the separator.

2. A linear guide bearing apparatus, comprising:

a guide rail including a first rolling groove which 25 axially extends on an outer surface thereof;

a main body fitted movably to the guide rail and including a second rolling groove confronted with the first rolling groove to form a load ball rolling path;

inside and outside members respectively disposed on an end surface of the main body to cooperatively form a curved circulating path defined by inside and outside curved faces; a plurality of balls moving along at least the load ball rolling path and the curved circulating path; and

a separator interposed between the adjacent balls such that an axial line of the separator is parallel to or coincides to a straight line combining center points of the adjacent balls, the separator defining concave faces at both ends thereof in the axial direction respectively at least partially contacting spherical surfaces of the adjacent balls;

wherein an outer diameter of the separator is set to have a size more than a maximum outer diameter under a condition where the balls roll while contacting with the both inside and outside curved faces of the curved circulating path, and

a corner portion of the end surface of the main body at the second ball rolling groove side is chamfered to avoid interference with the separator.

3. A linear guide bearing apparatus, comprising:

a guide member having a curved circulating path defined by inside and outside curved faces;

a plurality of balls moving along the curved circulating path of the guide member; and

a separator interposed between the adjacent balls such that an axial line of the separator is parallel to or coincides to a straight line combining center points of the adjacent balls, the separator defining concave faces at both ends thereof in the axial direction respectively at least partially contacting spherical surfaces of the adjacent balls,

wherein an outer diameter of the separator is set to have a size more than a maximum outer diameter under a condition where the balls roll while contacting with the both inside and outside curved faces of the curved circulating path, and less than 95% of the diameter of the ball.

4. A linear guide bearing apparatus, comprising:  
a guide member having a curved circulating path defined by inside and outside curved faces;

a plurality of balls moving along the curved circulating path of the guide member; and

a separator interposed between the adjacent balls such that an axial line of the separator is parallel to or coincides to a straight line combining center points of the adjacent balls, the separator defining concave faces at both ends thereof in the axial direction respectively at least partially contacting spherical surfaces of the adjacent balls,

wherein an outer diameter of the separator is set to have a size more than a maximum outer diameter under a condition where the balls roll while contacting with the both inside and outside curved faces of the curved circulating path, and

5        wherein an outer circumference of the outer diameter surface of the separator have a concave part for preventing interference with the inside curve in the curved circulating path.

10        5.     A linear guide bearing apparatus, comprising:  
a guide member having a curved circulating path defined by inside and outside curved faces;

a plurality of balls moving along the curved circulating path of the guide member; and

15        a separator interposed between the adjacent balls such that an axial line of the separator is parallel to or coincides to a straight line combining center points of the adjacent balls, the separator defining concave faces at both ends thereof in the axial direction respectively at least partially contacting  
20        spherical surfaces of the adjacent balls,

wherein an outer diameter of the separator is set to have a size more than a maximum outer diameter under a condition where the balls roll while contacting with the both inside and outside curved faces of the curved circulating path, and

25        wherein the outer diameter face of the separator is

slidingly contacted with the inside curve in the curved circulating path.

6. The linear guide bearing apparatus according to  
5 claim 5, wherein an outer diameter surface of the separator includes a projection slidingly contacting with the inside curve in the curved circulating path.